JOURNAL OF GREAT LAKES RESEARCH INDEX: VOLUME 17, 1991

VOL. 17 1991 No. 1

Editorial

Zebra mussels. **John M. Cooley** 1

Articles

Great Lakes total phosphorus model: post audit and regionalized sensitivity analysis. **Barry M. Lesht, Thomas D. Fontaine III, and David M. Dolan** 3

Size structure of particulate biogenic silica in Lake Michigan. **Daniel J. Conley and Donald Scavia** 18

Spatial and temporal changes in the offshore larval fish assemblage in southeastern Lake Michigan. **Richard D. M. Nash and Audrey J. Geffen** 25

Recent sedimentation in Lake Michigan. **Mark H. Hermanson and Erik R. Christensen** 33

Acute phototoxicity of harbor and tributary sediments from lower Lake Michigan. **Richard Davenport and Anne Spacie** 51

Summer circulation in the Kingston basin, Lake Ontario. **I. K. Tsanis, A. Masse, C. R. Murthy, and K. Miners** 57

Using larval fish abundance in the St. Clair and Detroit rivers to predict year-class strength of forage fish in Lakes Huron and Erie. **Charles O. Hatcher, Robert T. Nester, and Kenneth M. Muth** 74

Prey selection for the exotic cladoceran *Bythotrephes cederstroemi* by selected Lake Erie fishes. **Michael T. Bur and David M. Klarer** 85

Polychlorinated biphenyls in dated sediment cores from Green Bay and Lake Michigan. **Mark H. Hermanson, Erik R. Christensen, Dale J. Buser, and Li-Mei Chen** 94

Optics of Little Sodus Bay. **Steven W. Effler, MaryGail Perkins, and Bruce A Wagner** 109

An acoustic parametric array for measuring the thickness and stratigraphy of contaminated sediments. **J. Y. Guigné, N. Rukavina, P. H. Hunt, and J. S. Ford** 120

Phosphorus from internal sources in the Laurentian Great Lakes, and the concept of threshold external load. **Gertrud K. Nürnberg** 132

Note

Allozymic variation in *Bythotrephes cederstroemi;* a recent invader of the Great Lakes. **Lawrence J. Weider** 141

Anomalous diatom populations in Lakes Michigan and Huron in 1983. **Norman A. Andresen and Marc L. Tuchman** 144

VOL. 17 1991 No. 2

Editorial

A rationale for the use of colonial fish-eating birds to monitor the presence of developmental toxicants in Great Lakes fish. **Glen A. Fox, Michael Gilbertson, Andrew P. Gilman, and Timothy J. Kubiak** 151

Articles

Reproductive outcomes in colonial fish-eating birds: A biomarker for developmental toxicants in Great Lakes food chains. I. Historical and ecotoxicological perspectives. **Glen A. Fox, D. V. Weseloh, Timothy J. Kubiak, and Thomas C. Erdman** 153

Reproductive outcomes in colonial fish-eating birds: A biomarker for developmental toxicants in Great Lakes food chains. II. Spatial variation in the occurrence and prevalence of bill defects in young double-crested cormorants in the Great Lakes, 1979–1987. **Glen A. Fox, Brian Collins, Ellen Hayakawa, D. V. Weseloh, James P. Ludwig, Timothy J. Kubiak, and Thomas C. Erdman** ... 158

Northern large-river benthic and larval fish drift: St. Marys River, USA/Canada. **Michael H. Winnell and David J. Jude** 168

Influence of nearshore structure on growth and diets of yellow perch (*Perca flavescens*) and white perch (*Morone americana*) in Mexico Bay, Lake Ontario. **Robert J. Danehy, Neil H. Ringler, and John E. Gannon** 183

Phytoplankton photosynthesis in southern Lake Baikal: size-fractionated chlorophyll *a* and photosynthetic parameters. **Richard C. Back, David W. Bolgrien, Nina E. Guselnikova, and Nina A. Bondarenko** 194

Abundance, size, and recruitment of pink salmon (*Oncorhynchus gorbuscha*) in selected Michigan tributaries of the upper Great Lakes, 1984–1988. **John F. Kocik, William W. Taylor, and Wilbert C. Wagner** 203

Long-term decline in freshwater mussels (*Bivalvia: Unionidae*) of the western basin of Lake Erie. **Thomas F. Nalepa, Bruce A. Manny, James C. Roth, Samuel C. Mozley, and Donald W. Schloesser** 214

Applications of mass balance approach with censored data. **David M. Dolan and A. H. El-Shaarawi** 220

Recent changes in Lake Ontario 1981–1987: microfossil evidence of phosphorus reduction. **Julie A. Wolin, Eugene F. Stoermer, and Claire L. Schelske** 229

Temporal trends in metal concentrations in rivers, coastal-zone waters, and sediments of northern and eastern Georgian Bay. **Murray G. Johnson** 241

Zooplankton dynamics in a Great Lakes coastal marsh. **Kenneth A. Krieger and David M. Klarer** 255

Relation of sea lamprey size and sex ratio to salmonid availability in three Great Lakes. **Kim A. Houston and John R. M. Kelso** 270

Note

Seasonal incidence of *Bythotrephes cederstroemi* in the diet of yellow perch (ages 0–4) in Little Bay de Noc, Lake Michigan, 1988. **Philip J. Schneeberger** 281

Editorial. Alena Mudroch 183

VOL. 17 **1991** **No. 3**

Editorial

Ever the optimist. **William C. Sonzogni** 287

Articles

Tracers for fine sediment transport in Humber Bay, Lake Ontario. **John P. Coakley and Donald J. Poulton** 289

Distribution, abundance, and biology of the alewife in U.S. waters of Lake Superior. **Charles R. Bronte, James H. Selgeby, and Gary L. Curtis** 304

Mutagenicity of sediments from the Detroit River. **Alexander E. Maccubbin, Noreen Ersing, and Mary Ellen Frank** 314

Optical heterogeneity in Lake Champlain. **Steven W. Effler, MaryGail Perkins, and David L. Johnson** 322

Photosynthetic parameters as indicators of ecosystem health. **Joseph C. Makarewicz** 333

Feasibility of shoreside monitoring of the Great Lakes. **Joseph C. Makarewicz** 344

Preliminary observations of sediment erosion from a bottom resting flume. **Nathan Hawley** 361

Contaminant concentration trends in Lake Ontario lake trout (*Salvelinus namaycush*): 1977 to 1988. **Uwe Borgmann and D. Michael Whittle** 368

Hepatic mixed function oxidases induced in populations of white sucker, *Catostomus commersoni*, from areas of Lake Superior and the St. Marys River. **Ian R. Smith, Cameron B. Portt, and David A. Rokosh** 382

Knowledge about the Great Lakes environment: a comparison of publics. **Rosanne W. Fortner, Victor J. Mayer, Christine C. Brothers, and Frank R. Lichtkoppler** 394

Ice on Lake Ontario at Kingston. **Robert Gilbert** 403

Note

Periphyton accumulation at remote reefs and shoals in Lake Superior. **Thomas A. Edsall, Eugene F. Stoermer, and John P. Kociolek** 412

Minutes of the Annual Membership Meeting 419

VOL. 17 **1991** **No. 4**

Articles

Zooplankton grazing and phytoplankton abundance: an assessment before and after invasion of *Dreissena polymorpha*. **Lin Wu and David A. Culver** 425

Causes and consequences of cladoceran dynamics in Lake Michigan: implications of species invasion by *Bythotrephes*. **John T. Lehman** 437

Total and bioavailable particulate phosphorus loads from the Niagara River in 1987 and 1988. **Tatiana Mayer, Kenneth W. Kuntz, and A. Moller** 446

Effectiveness of recommended fat-trimming procedures on the reduction of PCB and mirex levels in brown trout (*Salmo trutta*) from Lake Ontario. **Michael P. Voiland, Jr., Ken L. Gall, Donald J. Lisk, and David B. MacNeill** 454

Estimation of organic and inorganic matter in inland waters: optical cross sections of Lakes Ontario and Ladoga. **Robert P. Bukata, John H. Jerome, Kirill Ya. Kondratyev, and Dimitry V. Pozdnyakov** 461

Satellite monitoring of optically-active components of inland waters: an essential input to regional climate change impact studies. **Robert P. Bukata, John H. Jerome, Kirill Ya. Kondratyev, and Dimitry V. Pozdnyakov** 470

Transport of suspended solids in the lower Fox River. **Joe Gailani, C. Kirk Ziegler, and Wilbert Lick** 479

Temperature and conductivity modeling for the Buffalo River. **Pei-Fang Wang and James L. Martin** 495

Atmospheric and tributary inputs of toxic substances to Lake Erie. **Thomas J. Kelly, Jean M. Czuczwa, P. R. Sticksel, G. M. Sverdrup, Paul J. Koval, and R. F. Hodanbosi** 504

Burrowing mayfly nymphs in western Lake Erie, 1942–1944. **Bruce A. Manny** 517

Distribution and abundance of caddisflies (Trichoptera) in the St. Clair-Detroit River system. **Bruce M. Davis, Patrick L. Hudson, and Brian J. Armitage** 522

Minimum light requirements for substrate colonization by *Cladophora glomerata*. **Richard C. Lorenz, Mark E. Monaco, and Charles E. Herdendorf** 536

Discovery and preliminary investigations of the remains of an early Holocene forest on the floor of southern Lake Michigan. **Michael J. Chrzastowski, Frank A. Pranschke, and Charles W. Shabica** 543

A lakewide comparison study of phytoplankton biomass and its species composition in Lake Huron, 1971 to 1985. **Joseph C. Makarewicz and Paul Bertram** 553

Index, Journal of Great Lakes Research, Volume 17, 1991 565
Fish Community Health: Monitoring and Assessment in Large Lakes

Author Index

Andresen, N. A., 144
Armitage, B. J., 522

Back, R. C., 194
Bertram, P., 553
Bolgrien, D. W., 194
Bondarenko, N. A., 194
Borgmann, U., 368
Bronte, C. R., 304
Brothers, C. C., 394
Bukata, R. P., 461, 470
Bur, M. T., 85
Buser, D. J., 94

Chen, L.-M., 94
Christensen, E. R., 33, 94
Chrzastowski, M. J., 543
Coakley, J. P., 289
Collins, B., 158
Conley, D. J., 18
Cooley, J. M., 1
Culver, D. A., 425
Curtis, G. L., 304
Czuczwa, J. M., 504

Danehy, R. J., 183
Davenport, R., 51
Davis, B. M., 522
Dolan, D. M., 3, 220

Edsall, T. A., 412
Effler, S. W., 109, 322
El-Shaarawi, A. H., 220
Erdman, T. C., 153, 158
Ersing, N., 319

Fontaine III, T. D., 3
Ford, J. S., 120
Fortner, R. W., 394
Fox, G. A., 153, 158
Frank, M. E., 319

Gailani, J., 479
Gall, K. L., 454
Gannon, J. E., 183
Geffen, A. J., 25
Gilbert, R., 403
Guigne, J. Y., 120
Guselnikova, N. E., 194

Hatcher, C. O., 74
Hawley, N., 361
Hayakawa, E., 158
Herdendorf, C. E., 536
Hermanson, M. H., 33, 94
Hodanbosi, R. F., 504
Houston, K. A., 270
Hudson, P. L., 522
Hunt, P. H., 120

Jerome, J. H., 461, 470
Johnson, D. L., 322
Johnson, M. G., 241
Jude, D. J., 168

Kelly, T. J., 504
Kelso, J. R. M., 270
Klarer, D. M., 85, 255
Kocik, J. F., 203
Kociolek, J. P., 412
Kondratyev, K. Y., 461, 470
Koval, P. J., 504
Krieger, K. A., 255
Kubiak, T. J., 153, 158
Kuntz, K. W., 446

Lehman, J. T., 437
Lesht, B. M., 3
Lichtkoppler, F. R., 394
Lick, W., 479
Lisk, D. J., 454
Lorenz, R. C., 536
Ludwig, J. P., 158

Maccubbin, A. E., 319
MacNeill, D. B., 454
Makarewicz, J. C., 333, 344, 553
Manny, B. A., 214, 517
Martin, J. L., 495
Masse, A., 57
Mayer, T., 446
Mayer, V. J., 394
Miners, K., 57
Moller, A., 446
Monaco, M. E., 536
Mozley, S. C., 214
Murthy, C. R., 57
Muth, K. M., 74

Nalepa, T. F., 214
Nash, R. D. M., 25
Nester, R. T., 74
Nurnberg, G. K., 132

Perkins, M., 109, 322
Portt, C. B., 382
Poulton, D. J., 289
Posdnyakov, D. V., 461, 470
Pranschke, F. A., 543

Ringler, N. H., 183
Rokosh, D. A., 382
Roth, J. C., 214
Rukavina, N., 120

Scavia, D., 18
Schelske, C. L., 229
Schloesser, D. W., 214
Schneeberger, P. J., 281
Selgeby, J. H., 304
Shabica, C. W., 543
Smith, I. R., 382
Sonzogni, W. C., 287
Spacie, A., 51
Sticksel, P. R., 504
Stoermer, E. F., 229, 412
Sverdrup, G. M., 504

Taylor, W. W., 203
Tsanis, I. K., 57
Tuchman, M. L., 144

Voiland, M. P., 454

Wagner, B. A., 109
Wagner, W. C., 203
Wang, P.-F., 495
Weider, L. J., 141
Weseloh, D. V., 153, 158
Whittle, D. M., 368
Winnell, M. H., 168
Wolin, J. A., 229
Wu, L., 425

Ziegler, C. K., 479

Geographic Index

Buffalo River, 495

Detroit River, 74, 319, 522

Fox River, 479

Georgian Bay, 241
Green Bay, 94, 153, 158, 281

Lake Baikal, 194
Lake Champlain, 322
Lake Erie, 74, 85, 141, 214, 255, 394, 425, 504, 536
Lake Huron, 74, 141, 144, 203, 553
Lake Ladoga, 461
Lake Michigan, 18, 25, 33, 51, 94, 144, 203, 281, 437, 543
Lake Ontario, 57, 109, 183, 229, 289, 333, 344, 368, 403, 454, 461
Lake Superior, 203, 304, 382, 412

Niagara River, 446

St. Clair River, 74, 522
St. Lawrence River, 57
St. Marys River, 168

Subject Index

acid rain, 241
acoustics, 120
alewife, 25, 74, 304
algae, 412
aquatic components, 470
atmospheric deposition, 504

benthic fauna, 168, 214
benthic flora, 412
benthos, 168, 522
bioassay, 319, 382
biochemical tests, 382
bioindicators, 333
biomass, 517
biomonitoring, 153, 158
bivalves, 425
Buffalo River, 495

caddisflies, 522
chlorophyll, 461
cladocerans, 255
Cladophora, 536
climatology, 403, 470
coastal waters, 241, 344
conductivity, 495
copepods, 85, 255
crustaceans, 437

DDE, 368
density, 517
Detroit River, 74, 319, 522
diatoms, 18, 229
discharge, 446
diversity, 522
dredging, 51

education, 394
electrophoresis, 141
Ephemeroptera, 517
erosion rates, 361
eutrophic lakes, 132
eutrophication, 132, 229
exotic species, 85

filamentous algae, 536
fish, 241
fish diet, 304
fish diets, 85, 183
fish establishment, 203, 304
fish growth, 183, 304
fish management, 203, 270, 281
fish populations, 25, 74, 168
flow, 446
flow characteristics, 220
flumes, 361
food chains, 437
Fox River, 479

Georgian Bay, 241
global warming, 403
grazing, 425
Green Bay, 94, 153, 158, 281
growth, 517

harbors, 51
heavy metals, 241
Hexagenia, 517
Holocene, 543
hydrodynamic modeling, 479
hydrodynamics, 495

ice, 403
indicators, 333
inorganic matter, 461
invertebrates, 168

Lake Baikal, 194
Lake Champlain, 322
lake circulation, 57
Lake Erie, 74, 85, 141, 214, 255, 394, 425, 504, 517, 536
Lake Huron, 74, 141, 144, 203, 553
lake ice, 403
Lake Ladoga, 461
Lake Michigan, 18, 25, 33, 51, 94, 144, 203, 281, 437, 543
Lake Ontario, 57, 109, 183, 229, 289, 333, 344, 368, 403, 454, 461
lake sediments, 33, 94, 120
Lake Superior, 203, 304, 382, 412
lake trout, 368
lamprey, 270
light, 536
light attenuation, 109
light penetration, 322
loading rate, 220

marshes, 255
mathematical models, 3, 33, 132
mercury, 368
metals, 241
mirex, 454
mollusks, 214
monitoring, 144, 344
Monte Carlo method, 3
mussels, 214
mutagen, 319

nearshore processes, 289
Niagara River, 446

oligotrophic, 553
optical cross section, 461
optical properties, 109, 322
optical reflectance, 461
optical transparency, 461
organic matter, 461

paleoforest, 543
paleolimnology, 229
particle size, 18
perch, 25, 85, 183
phosphorus, 3, 132, 229, 446
photoactivation, 51
photosynthesis, 194, 333
phytoplankton, 144, 322, 425, 553
plankton, 194
pollution, 522
pollution effects, 214
pollution load, 504
pollution sources, 94
polychlorinated biphenyls, 94, 368 454
polycyclic aromatic hydrocarbons, 382
primary productivity, 194
public opinion, 394

radioactive dating, 33, 94
radioactive tracers, 289
reflectance, 109
remote sensing, 57

salmon, 203, 270
satellite monitoring, 470
sculpin, 25
sea lamprey, 270
Secchi disk, 109
sediment distribution, 33, 120
sediment erosion, 361
sediment transport, 289
sediment-water interfaces, 33
sedimentation rates, 33
sediments, 51, 241, 319
shad, 74
shear stress, 361
silica, 18
simulation analysis, 3
smelt, 25, 74
species composition, 437, 522
St. Clair River, 74, 522
St. Lawrence River, 57
St. Marys River, 168
statistical analysis, 220
statistical methods, 220
stratigraphy, 120
streamflow, 220
submarines, 412
surveys, 394
suspended solids, 220, 446, 479

temperature, 495
toxic substances, 51, 153, 158, 319, 368, 504
trace metals, 504
transport, 479, 495
tributaries, 220
trichoptera, 522
trout, 454
turbidity, 344

water birds, 153, 158
water currents, 57
water quality, 495, 536
wetlands, 255
wildlife, 153, 158
wind-driven currents, 57

zooplankton, 85, 141, 255, 281, 425, 437